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ORIGINAL ARTICLE

Efficacy and Patient Satisfaction of Laser Labiaplasty for Labia Minora Hypertrophy: A Retrospective Analysis

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Abstract: Background: Labia minora hypertrophy can lead to aesthetic dissatisfaction and functional discomfort among women, affecting their quality of life and sexual self-esteem. Traditional surgical labiaplasty techniques are effective but are associated with higher complication rates and longer recovery times. This study aims to evaluate the efficacy, safety, and patient satisfaction of laser labiaplasty as a minimally invasive alternative for labia minora reduction. Methods: A retrospective analysis was conducted on 60 female patients who underwent laser labiaplasty. Preoperative assessments included medical history, gynecological examination, and patient-reported concerns. The procedure utilized a CO_2 laser for tissue excision without the need for sutures. Postoperative outcomes were evaluated through follow-up visits and telephone interviews, focusing on complications, recovery time, and patient satisfaction measured by the Subjective Global Aesthetic Improvement Scale (sGAIS). Results: The primary motivations for surgery were aesthetic concerns (85%) and functional discomfort (55%). The mean age was 34.7 years. Minor complications included transient postoperative bleeding (10%) and mild discomfort (25%), with no major complications reported. High satisfaction rates were observed, with 92% of patients reporting significant improvement (sGAIS scores of 4 or 5). Conclusions: Laser labiaplasty is an effective, minimally invasive procedure with high patient satisfaction and low complication rates. It offers a viable alternative to traditional surgical methods for women seeking labia minora reduction due to aesthetic or functional concerns.

Keywords: laser labiaplasty; labia minora hypertrophy; patient satisfaction; minimally invasive procedure; genital aesthetics

INTRODUCTION

Labia minora hypertrophy, characterized by the enlargement or elongation of the inner vaginal lips, has been a largely recognized condition [1,2]. Women experiencing this condition often report both aesthetic dissatisfaction and functional issues, such as discomfort during physical activities or sexual intercourse [3,4]. The increased visibility and awareness of genital aesthetics in contemporary society have led to a growing number of women seeking corrective procedures to address these concerns [5,6].

Genital aesthetics significantly impact a woman's sexual self-esteem and overall quality of life [7,8]. Studies have demonstrated that dissatisfaction with genital appearance can lead to psychological distress, reduced sexual function, and decreased confidence [9,10]. The rise of media portrayal of idealized genital images has further influenced women's perceptions, prompting many to pursue medical interventions to achieve their desired appearance [11].

Traditional surgical labiaplasty techniques, including edge resection, wedge resection, Z-plasty, and deepithelialization, have been employed to reduce labial tissue [12,13]. While effective, these methods are associated with risks such as scarring, altered sensation, asymmetry, and extended recovery periods. These potential complications have led both patients and clinicians to explore less invasive alternatives that offer effective results with fewer risks [14].

Laser labiaplasty has emerged as a minimally invasive option that utilizes laser technology to excise excess labial tissue precisely [15,16]. Introduced more than 15 years ago using a neodymium-doped yttrium aluminum garnet (Nd) laser, the technique has evolved with the adoption of carbon dioxide (CO_2) and erbium-doped yttrium aluminum garnet (Er) lasers [17]. These lasers offer advantages such as reduced intraoperative bleeding, minimal thermal damage, and enhanced healing, contributing to improved patient outcomes.

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Despite the growing popularity of laser labiaplasty, there is a paucity of comprehensive studies evaluating its efficacy, safety, and patient satisfaction. Most existing literature comprises small case series or focuses on surgical techniques without detailed analysis of patient-reported outcomes [18,19]. This gap underscores the need for robust clinical data to inform practitioners and patients about the benefits and limitations of this procedure. Therefore, the objective of this study is to retrospectively analyze our center's experience with laser labiaplasty in treating labia minora hypertrophy. By examining preoperative motivations, procedural details, postoperative outcomes, and patient satisfaction, we aim to provide valuable insights into the efficacy and safety of laser labiaplasty as a minimally invasive alternative to conventional surgical methods.

MATERIALS AND METHODS

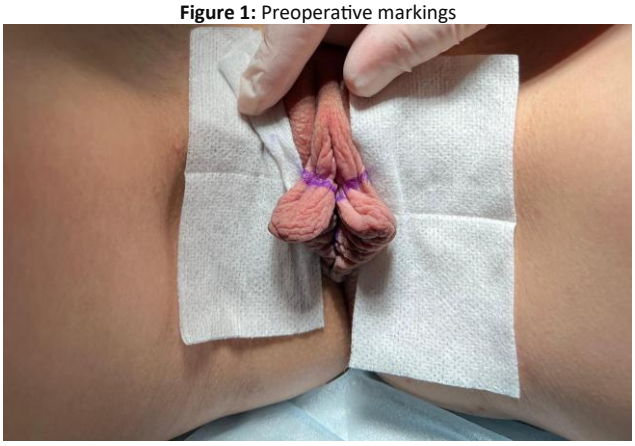
This retrospective study analyzed data from 60 female patients who underwent laser labiaplasty between June 2020 and September 2024. Inclusion criteria encompassed women aged 18 years or older diagnosed with labia minora hypertrophy, who expressed aesthetic or functional concerns and completed a minimum of six months of follow-up. Exclusion criteria included active genital infections, uncontrolled systemic diseases, previous labiaplasty, or other genital surgeries.

All patients underwent a comprehensive preoperative evaluation. Medical and gynecological histories were obtained, focusing on reproductive history, menstrual cycle details, prior pregnancies, and any gynecological conditions or surgeries. Physical examination included measurement of labia minora dimensions using standardized calipers. Preoperative investigations included a Papanicolaou (PAP) smear, vaginal secretion analysis for infections, and a transvaginal ultrasound to assess pelvic anatomy.

The classification of labial hypertrophy identifies three types of labial hypertrophy, based on Stephane Smarrito's study [20]: Type I, known as the "flag," affects the anterior one-third and was found in 11% of the cases; Type II, or the "oblique," involves the middle third and accounted for 29% of cases; and Type III, termed "complete," includes the posterior third, observed in 60% of the patients. Symptomatically, Type I patients typically reported aesthetic concerns and discomfort from tight clothing without dyspareunia. Type II was noted for a fuller appearance, and Type III frequently presented with dyspareunia more so than the other types. Surgical approaches were tailored accordingly, with Type I cases treated using a superior pedicle flap technique for moderate labial resection, while Types II and III were approached with the lambda laser technique. This classification system allows for more targeted surgical strategies that align closely with patient symptoms and expectations, providing a significant improvement over the traditional method based solely on dimensional measurement.

The procedure was performed under local anesthesia. Initially, a topical anesthetic cream containing lidocaine 2.5% and prilocaine 2.5% was applied to the labia minora for 30 minutes. After the removal of the cream and disinfection with povidone-iodine solution, infiltration anesthesia was administered using 1% lidocaine with epinephrine 1:100,000 via a 30G needle. Preoperative markings were made to delineate the extent of tissue excision (Figure 1).

Figure 1: Preoperative markings



A CO_2 laser (CO_2RE, Syneron Candela) equipped with a surgical handpiece was set to a continuous wave mode at 10 Watts. The laser was used to excise excess labial tissue along the marked lines, ensuring symmetrical reduction and preservation of the natural contour (Figure 2). Hemostasis was achieved through the laser's coagulative properties, eliminating the need for sutures. After the procedure, the area was treated with topical fusidic acid ointment and covered with a sterile dressing.

Patients received detailed postoperative instructions, including applying fusidic acid ointment twice daily for one week; maintaining local hygiene with gentle cleansing using mild soap and water; avoiding sexual activity, strenuous exercise, swimming pools, and saunas for six weeks; and wearing loose-fitting clothing to minimize friction.

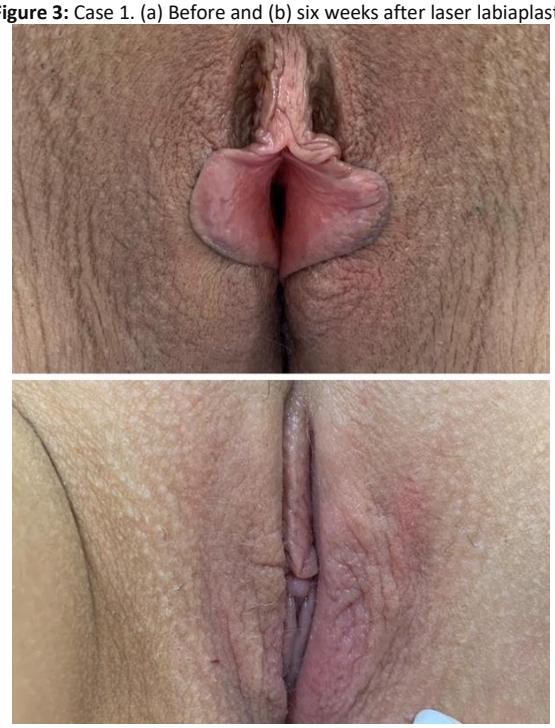
Follow-up visits were scheduled at one week, one month, three months, and six months postoperatively. Evaluations focused on wound healing, identification of any complications, and assessment of patient satisfaction using the Subjective Global Aesthetic Improvement Scale (sGAIS), a validated 5-point scale ranging from 1 (no improvement) to 5 (very significant improvement).

After the clamps were removed, the treated area was managed with targeted local applications of anti-inflammatory and antibiotic solutions. Specifically, Fucidin H cream, containing fusidic acid 20 mg/g and hydrocortisone acetate 10mg/g, was used in conjunction with Baneocin powder, which includes zinc bacitracin 250 UI and neomycin sulphate 500 UI/g. To control bleeding and further protect the site, a hemostatic sponge was placed over these topical agents, and the area was subsequently dressed. Pain management was addressed systemically through an intravenous administration of acetaminophen 10mg/ml, amounting to 100 ml, and an oral dose of Ketonal Forte, which contains ketoprofen at a concentration of 100 mg.

Figure 2: Excised excess labial tissue

Discharge instructions provided to the patient emphasized crucial care steps to ensure proper healing. The patient was instructed to maintain local compression and restrict themselves to bed rest on the day of the procedure to minimize movement and stress at the site. For the initial three weeks post-procedure, the patient was advised to clean the area using Betadine and apply the previously mentioned Fucidin H cream and Baneocin powder twice daily. In the subsequent three weeks, the regimen shifted to cleaning with water and soap followed by the application of a protective repairing cream to foster skin restoration and barrier function.

Figure 3: Case 1. (a) Before and (b) six weeks after laser labiaplasty



At the six-week post-procedure mark, a follow-up consultation was arranged to evaluate the healing progress and the cosmetic outcome of the laser labiaplasty. The provided figures (Figure 1 and Figure 2), display the condition of the area before the procedure and at the six-week follow-up. These images illustrate a notable reduction in labial size and improved symmetry, indicating a successful aesthetic enhancement. The area appeared to be well-healed without signs of infection or significant inflammation, underscoring the effectiveness of the postoperative care regimen.

Figure 4: Case 2. (a) Before and (b) six weeks after laser labiaplasty

RESULTS

The study included 60 women aged between 19 and 52 years, with a mean age of 34.7 years. The average age at menarche was 13.1 years. Regarding reproductive history, 40% of patients were nulliparous, 35% had one pregnancy, and 25% had two or more pregnancies. Positive gynecological history, such as polycystic ovary syndrome, previous cesarean sections, or uterine fibroid removal, was present in 30% of patients. This demographic distribution indicates a diverse patient population seeking laser labiaplasty (Table 1).

Table 1: Demographic and Clinical Characteristics

Parameter	Mean (SD)	Range
Age (years)	34.7 (7.8)	19 - 52
Age at menarche (years)	13.1 (1.4)	11 - 16
Number of pregnancies	0.9 (1.1)	0 - 4
Positive gynecological history (%)	30%	N/A

SD – Standard Deviation

Aesthetic concerns were the primary motivation for 85% of patients, highlighting the significance of genital appearance in this cohort. Functional discomfort during daily activities, such as exercise or wearing tight clothing, was reported by 55% of patients. Discomfort during sexual intercourse affected 45%, indicating that labia minora hypertrophy can significantly impact sexual function. Recurrent infections or hygiene difficulties were less common but still noteworthy at 15% (Table 2).

Table 2: Preoperative Motivations

Motivation	Number of Patients (%)
Aesthetic concerns	51 (85%)
Functional discomfort during activities	33 (55%)
Discomfort during sexual intercourse	27 (45%)
Recurrent infections/hygiene issues	9 (15%)

Postoperative complications were minimal. Mild bleeding occurred in 10% of patients, resolving within an average of 2.3 days without intervention. Mild to moderate discomfort was experienced by 25% of patients, lasting approximately 4.2 days. Notably, statistical analysis revealed a significant association between previous pregnancies and postoperative discomfort ($p=0.03$), suggesting that multiparous women may experience more discomfort due to tissue changes from childbirth. No infections or hematomas were

reported, indicating a favorable safety profile (Table 3).

Table 3: Postoperative Complications and Recovery

Complication	Number of Patients (%)	Duration (Days)	p-value
Mild bleeding - Total	6 (10%)	2.3 (1.1)	0.12
Mild to moderate discomfort – Nulliparous	6 (10%)	4.0 (1.5)	-
Mild to moderate discomfort – One pregnancy	5 (8.3%)	4.1 (1.6)	-
Mild to moderate discomfort – Multiparous	4 (6.7%)	4.5 (1.8)	0.03*
Infection	0 (0%)	N/A	N/A
Hematoma	0 (0%)	N/A	N/A

* *Student's t-test*

Table 4 provides a comprehensive overview of patient satisfaction following laser labiaplasty, as measured by the standardized Global Aesthetic Improvement Scale (sGAIS). The table categorized patient responses into five distinct levels, highlighting the overwhelmingly positive feedback received. Specifically, a majority of 33 patients, accounting for 55% of the total surveyed, reported a "Very significant improvement" in their condition, with an sGAIS score of 5. This indicated that these patients perceived the results of their surgery as greatly surpassing their expectations in terms of both aesthetic appeal and functional benefits. Additionally, 22 patients, representing 37% of the total, observed a "Significant improvement," scoring a 4 on the sGAIS. This suggests that for a large number of patients, the procedure substantially met their initial goals and resulted in marked enhancements.

On the lower end of the scale, 5 patients, making up 8% of the total, felt they had only "Moderate improvement," denoted by a score of 3 on the sGAIS. This group perceived the changes as noticeable but not as extensive as perhaps hoped for. Importantly, the table showed that no patients reported a lack of change or a worsening of their condition post-procedure, with zero reports in both the "No change" and "Worsened condition" categories (scores of 2 and 1, respectively). This absence of negative feedback underscored the effectiveness and safety of laser labiaplasty in achieving desired outcomes without adverse effects. The data clearly demonstrated a high level of patient satisfaction overall, with 92% of participants rating their improvement as significant or very significant, highlighting the procedure's ability to meet or exceed patient expectations in the vast majority of cases.

Table 4: Patient Satisfaction (sGAIS Scores)

Satisfaction Level	No/Mild Complications n (%)	Moderate Complication n (%)	Total	p-value*
Very Significant Improvement	32 (97%)	1 (3%)	33	
Significant Improvement	16 (73%)	6 (27%)	22	
Moderate Improvement	0 (0%)	8 (100%)	5	
p-value				<0.001

* *Chi-square test*

Among 60 patients, 34 who were satisfied and 17 who were less satisfied cited aesthetic concerns, against expected counts of 37.4 and 13.6, respectively. Functional discomfort during activities was reported by 28 satisfied and only 5 less satisfied patients, compared to expected figures of 24.2 and 8.8. For discomfort during sexual intercourse, 20 satisfied and 7 less satisfied patients were recorded, versus an expected count of 19.8 for satisfied and 7.2 for less satisfied. Lastly, recurrent infections or hygiene issues were less commonly reported, with 6 satisfied and 3 less satisfied patients, aligning closely with expected values of 6.6 and 2.4. The overall chi-square analysis resulted in a p-value of 0.306, indicating no significant statistical association across the groups (Table 5).

Table 5: Analysis of Complaints and Patient Satisfaction Post-Laser Labiaplasty

Complaint Type	Satisfied Patients (n = 40, %)	Less Satisfied Patients (n = 20, %)	Expected (Satisfied)	Expected (Less Satisfied)	p-value
Aesthetic concerns	34	17	37.4	13.6	
Functional discomfort during activities	28	5	24.2	8.8	
Discomfort during sexual intercourse	20	7	19.8	7.2	
Recurrent infections/hygiene issues	6	3	6.6	2.4	
p-value					0.306

Patients with Type III hypertrophy showed a substantially higher improvement in sexual discomfort ($p < 0.001$), aligning with their higher baseline rates of dyspareunia. Differences in aesthetic and functional improvements were not statistically significant across the three groups ($p = 0.43$ and $p = 0.07$, respectively), although Type II and Type III trended toward slightly greater gains than Type I. Reduction in hygiene-related complaints was similar among all types ($p = 0.73$). Overall satisfaction (sGAIS) remained high across all groups, with no statistically significant variation ($p = 0.56$), as presented in Table 6.

Table 6: Postoperative Quality of Life Differences by Labial Hypertrophy Type

Variable	Type I	Type II	Type III	p-value
Mean Improvement in Aesthetic Concerns (0-10 scale, higher = greater improvement)	4.7 ± 1.3	4.9 ± 1.1	5.1 ± 1.2	0.43
Mean Improvement in Functional Discomfort (0-10 scale)	5.4 ± 1.3	6.2 ± 1.4	6.3 ± 1.6	0.07
Mean Improvement in Sexual Discomfort (0-10 scale)	3.3 ± 1.0	4.6 ± 1.2	6.6 ± 1.5	<0.001
Patients Reporting Fewer Hygiene Issues (n, %)	2 (28.6%)	4 (23.5%)	10 (27.8%)	<0.001
Mean Postoperative sGAIS Score (1-5 scale*)	4.4 ± 0.5	4.3 ± 0.6	4.5 ± 0.4	0.56

** Standardized Global Aesthetic Improvement Scale (SGAIs): 1 – Worsened; 2 – No Change; 3 – Moderate Improvement; 4 – Significant Improvement; 5 – Very Significant Improvement.*

DISCUSSION

Literature findings

The study demonstrates that laser labiaplasty is a safe and effective minimally invasive procedure for treating labia minora hypertrophy. The high patient satisfaction rates align with existing literature, indicating that laser techniques offer significant advantages over traditional surgical methods. The predominance of aesthetic concerns as a motivation reflects societal trends emphasizing genital aesthetics and their impact on women's self-esteem and sexual health.

The low incidence of postoperative complications, such as bleeding and discomfort, highlights the safety profile of laser labiaplasty. The precise excision and coagulative properties of the CO_2 laser reduce intraoperative bleeding and eliminate the need for sutures, contributing to faster healing and reduced postoperative pain. The absence of infections and hematomas in our cohort further supports the procedure's safety.

The significant association between previous pregnancies and increased postoperative discomfort may be attributed to changes in tissue elasticity and sensitivity resulting from childbirth. This finding suggests that multiparous women may require additional preoperative counseling and postoperative support to manage expectations and enhance recovery.

In the realm of female genital cosmetic surgery, the studies by Pardo et al. [21] and Bizjak-Ogrinc et al. [22] provide valuable insights into the efficacy and patient satisfaction associated with different techniques of laser labiaplasty of the labia minora. Pardo et al. [21] reported on 55 cases conducted between October 2003 and November 2004, where the primary indications were moderate hypertrophy and labial asymmetry, with 67% of cases due to these reasons. They noted a high satisfaction rate, with 91% of patients reporting being very satisfied and 9% satisfied, despite a 7% incidence of minimal suture dehiscence during the early postoperative period. In a similar manner, the study by Bizjak-Ogrinc et al. [22], which analyzed 80 patients from February 2015 to April 2018, found an equally high level of patient satisfaction with the sutureless laser labiaplasty technique. Their approach, interestingly, reported minimal side effects—7 instances of wound infection, and one case each of bleeding and hematoma formation, yet no patients were partly satisfied or dissatisfied. sutures.

Similarly, Li et al.'s study on 17 Chinese women, with an average age of 36.4 years, demonstrated significant improvements in vulvar texture and pigmentation after three treatment sessions, with a scoring system showing substantial changes ($p < 0.05$) and no adverse reactions [23]. Patients self-reported enhanced satisfaction, indicating both perceived and observed effectiveness. Similarly, Lauterbach et al. [24] assessed vaginal CO_2 laser treatment in a cohort of 25 women with sexual dysfunction and pelvic floor issues. They reported significant increases in vaginal elasticity and tightening post-treatment (54.8 ± 5.2 vs. 41.5 ± 6.3, P = 0.0027; 1.97 ± 0.25 vs. 1.32 ± 0.31, P = 0.0014), as well as improvements in pelvic muscle contraction strength (25.9 ± 3.5 vs. 16.5 ± 4.2, P = 0.0011) and FSFI and VHI scores. This study utilized vaginal tactile imaging (VTI) for objective assessment, adding robust quantification to support the clinical effectiveness of CO2 laser treatment in enhancing vaginal biomechanical properties.

Moreover, Messas et al. [25] reviewed 40 studies involving 3466 participants to assess the efficacy of fractional CO_2 ($FrCO_2$) laser therapy in treating genitourinary syndrome of menopause (GSM) and vulvovaginal atrophy (VVA) [25]. Their findings highlight the therapy's good efficacy and safety, with high patient satisfaction noted across studies. However, they also pointed out the lack of level I evidence and called for more randomized, sham-controlled trials to validate these results further and address clinical questions such as cost-effectiveness and potential synergistic effects with other treatments. Similarly, Géczi et al. [26] conducted a systematic review and meta-analysis of various labiaplasty techniques, analyzing data from 86 studies. They reported a high overall satisfaction rate (94%, CI 93%-95%) with specific techniques like deepithelialization, reaching even higher satisfaction rates (97%, CI 85%-99%). Despite these high satisfaction rates, they noted variations in complication rates across different techniques, with some, like the wedge resection, showing higher incidences of complications such as dehiscence. Both studies underscore the importance of personalized treatment approaches and the need for high-quality research to optimize outcomes in cosmetic genital surgeries.

The study by Smarrito et al. [27] provided a focused examination of secondary labiaplasties, reporting on 44 cases split into two main categories: those involving wound dehiscence primarily from lambda laser procedures and those related to over-resections or amputations. The authors highlighted the use of local flaps and lipofilling techniques to address aesthetic and functional issues resulting from over-resection, emphasizing the importance of surgical precision and anatomical knowledge to prevent such complications. In a similar manner, the systematic review and meta-analysis by Escandón et al. [28] surveyed a much larger cohort of 3804 patients across 46 studies, reporting a high satisfaction rate of 99% for labia minoraplasty. However, they also noted significant

complications, such as a 5% incidence of dehiscence from laser-assisted labiaplasty and up to 8% hematoma formation from W-shape resection. Both studies underscore the necessity of thorough training in surgical techniques and patient-specific approaches to optimize outcomes and minimize the need for subsequent corrective procedures. The findings from Escandón et al. [28] further support the observations of Smarrito et al. [27] by quantitatively demonstrating the impact of technique selection on complication rates and patient satisfaction, thereby reinforcing the call for meticulous surgical practice and adequate anatomical understanding in labiaplasty procedures.

Limitations

This study has several limitations. While the study provides valuable insights, limitations include its retrospective design and the reliance on patient-reported outcomes, which may introduce bias. The lack of a control group undergoing traditional surgical labiaplasty limits direct comparison of efficacy and safety between techniques. The retrospective design may introduce selection bias, as only patients who returned for follow-up were included. The sample size, while larger than some previous studies, is relatively small and may not represent the broader population. Reliance on subjective measures like the sGAIS may not capture objective functional improvements. Additionally, the absence of a control group limits the ability to compare laser labiaplasty directly with traditional surgical methods. Future prospective, randomized studies with larger sample sizes are warranted to validate these findings and optimize patient selection and procedural protocols.

CONCLUSION

Laser labiaplasty is an effective and safe, minimally invasive procedure for women seeking labia minora reduction due to aesthetic or functional concerns. The high patient satisfaction rates and low incidence of complications make it a valuable alternative to traditional surgical techniques. Personalized patient counseling and careful consideration of individual medical histories can further enhance outcomes. Future research should focus on long-term results and direct comparisons with other surgical modalities to establish standardized guidelines.

Conflicts of interest and sources of funding

The authors declare no conflict of interest. No artificial intelligence automatically generated text was inserted in this manuscript, and no image was previously published in another journal or is under consideration of being published elsewhere. This research received no external funding.

Authors' contribution

Conceptualization, F.D.; methodology, F.D.; software, F.D.; validation, M-M.C. .; formal analysis, M-M.C.; investigation, M-M.C..; resources, S.A.; data curation, S.A.; writing—original draft preparation, F.D., M.M.C. and S.A.; writing—review and editing, D.O.C. and F.D.; visualization, D.O.C. and FD.; supervision, D.O.C.; project administration, D.O.C. and F.D.; All authors have read and agreed to the published version of the manuscript.

Ethics approval and consent to participate

The study was conducted in accordance with the Declaration of Helsinki and approved by the Ethics Committee of Elos Clinic from Bucharest, Romania (protocol code NR 29 and date of approval 6 January 2020).

Patient consent for publication

Consent was obtained from all subjects involved in the study. Written informed consent has been obtained from the patients to publish this paper.

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